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Artificial Intelligence Adoption and Government Financial Reporting Transparency: Evidence from Nigeria's Federal Public Sector

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Abstract

Transparency is widely expected to sustain public trust in government, and artificial intelligence (AI) is increasingly proposed as a means of making public financial information more open, timely and understandable. This study examines whether the overall level of documented AI adoption is associated with the transparency of government financial reporting in Nigeria's federal public sector, and what the evidence implies for public trust. A balanced panel of five federal institutions: the Federal Ministry of Finance, the Office of the Accountant-General of the Federation, the Federal Inland Revenue Service, the Central Bank of Nigeria and the Bureau of Public Procurement were observed from 2015 to 2024. Documentary evidence from annual reports, audit-related documents and AI-implementation documents is scored on a five-point (0–4) rubric and analysed with pooled, fixed-effects, trend-adjusted, first-difference and lagged regressions, interpreted through agency theory. Overall AI adoption is positively and significantly associated with transparency and credibility of financial reports (pooled $\beta = 0.701$, $R^2 = 0.810$; fixed-effects $\beta = 0.708$). Unlike the study's other AI–outcome relationships, however, this one is not robust throughout: the trend-adjusted coefficient (0.616) is only marginally significant ($p = 0.051$), and the first-difference coefficient (0.604) is not statistically significant ($p = 0.112$), although the lagged estimate (0.599) is. Transparency also has the lowest mean score of the five outcomes. The outcome is a documentary score of openness and credibility, not a survey of citizens, so the results speak to the supply of transparency and cannot establish public trust itself. Because the design is observational, the measures are documentary indices, and the sample is small and purposively selected, the results indicate association rather than proven causation and are interpreted for the five institutions examined rather than for all federal ministries, departments and agencies. AI adoption appears to be a helpful but insufficient condition for transparent reporting; communication, civic capacity and audit validation matter too.

Keywords: *Artificial intelligence; transparency; public trust; government financial reporting; open government; Nigeria.*

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Introduction

Citizens cannot supervise what they cannot see. Government financial reports, budgets and audit findings are the main instruments through which public officials make their stewardship visible, and the case for transparency rests on the idea that visibility strengthens accountability and, in turn, public trust. The Nigerian record gives reason to ask how far transparency has actually advanced. Audit findings on the Federal Government's consolidated statements have documented late submission and verification limits (Office of the Auditor-General for the Federation, 2024), conditions under which citizens and legislators struggle to scrutinise public money.

AI technologies are increasingly proposed as a response. Natural language processing can translate complex statements into accessible summaries (Ahmed & Chen, 2023; Kumar & Singh, 2023); automated disclosure and anomaly-detection features can make reporting more timely and credible (Li & Wang, 2024); and digital platforms can widen citizen participation (Zhao et al., 2023). Nigeria's own movement toward a National Artificial Intelligence Strategy (Federal Ministry of Communications, Innovation and Digital Economy, 2024) signals policy interest. But a transparency claim has two parts that are often run together: that AI makes government reporting more open, accessible and credible (the supply side), and that this in turn raises citizens' trust (the demand side). Only the first can be examined with institutional documents.

This article therefore asks a narrower and more answerable question than its title may suggest: is the overall level of documented AI adoption in federal institutions associated with greater transparency of their financial reporting, and how robust is that association? It treats the implications for public trust as a matter of interpretation, not measurement. The study contributes a panel-based test for Nigerian federal institutions and an explicit assessment of where the evidence is strong and where it is not.

Statement of the Problem

The case for transparency rests on a chain that runs from disclosure, through scrutiny, to accountability and trust. The chain can break at any point: information may be published but inaccessible; accessible but incomplete; complete but too late to inform decisions; or all of these, yet unattended by citizens, media or legislators with the capacity to act on it. In Nigeria's federal public sector, the documented late submission and verification limits on consolidated financial statements (Office of the Auditor-General for the Federation, 2024) illustrate where the chain can fail at the disclosure end.

AI adoption is often proposed as a way to strengthen the disclosure end of the chain. Automated summarisation, machine-readable data, anomaly detection and digital platforms can, in principle, make financial information more timely, consistent and understandable. However, the existing evidence is dominated by cross-sectional studies and studies in wealthier jurisdictions, and several measure trust through perception surveys that are not available for Nigerian federal institutions over the study period. There is little panel evidence for Nigerian federal institutions on whether documented AI adoption is associated with documented transparency, and little attention to whether the association is robust to institutional differences and common temporal trends.

A further problem concerns the concept of transparency itself. Transparency has a supply side which involves the openness, clarity and credibility of published information and a demand side which is the extent to which citizens, media and civil society can use that information and come to trust government. Institutional documents can only evidence the supply side. A study that treats documented transparency as a proxy for public trust would therefore overreach its data. The distinction matters for policy: if AI adoption improves the supply of transparency but not its use, the appropriate policy response is not more technology but more communication, civic capacity and independent validation.

Accordingly, this study examines the association between documented overall AI adoption and the transparency of government financial reporting in five Nigerian federal institutions over the period 2015–2024, and assesses whether the association is robust to institutional differences, common temporal trends and potential reverse causality. It is explicit that its outcome is documented transparency and credibility, which is a necessary but not sufficient condition for public trust, and it interprets the implications for trust accordingly.

Aim and Objectives of the Study

The main aim of this study is to examine the association between the overall level of documented AI adoption and the transparency of government financial reporting in Nigeria's federal public sector.

The specific objective is:

i. To examine the association between the overall level of documented AI adoption (AIA) and the transparency of government financial reporting (FRQ5) in Nigeria's federal public sector.

Research Question

This study is guided by the research question below:

i. What is the association between the overall level of documented AI adoption and the transparency of government financial reporting in Nigeria's federal public sector?

Research Hypothesis

The study tests the following hypothesis at the 5% level of significance:

H_0: The overall level of documented AI adoption is not significantly associated with the transparency of government financial reporting in Nigeria's federal public sector.

H_1: The overall level of documented AI adoption is positively and significantly associated with the transparency of government financial reporting in Nigeria's federal public sector.

Significance of the Study

Policy: the findings will provide evidence on whether documented AI adoption is associated with documented transparency in Nigeria's federal public sector, and on whether that association is robust. The distinction between supply-side transparency and demand-side trust is directly relevant to policy design: if AI adoption is a helpful but

insufficient condition, investment in technology should be accompanied by publication standards, plain-language communication, machine-readable data and independent audit validation.

Practice: the study will identify the extent to which federal institutions with higher documented AI adoption show higher transparency scores, and will show where the evidence weakens once institutional differences and common trends are controlled. It will recommend that institutions publishing AI-supported reports document how AI is used, release machine-readable data and subject automated outputs to independent audit.

Research: the study will contribute panel evidence for Nigerian federal institutions and demonstrate an explicit assessment of where the evidence is strong and where it is not. It will identify directions for future research, including direct measurement of citizen trust, disaggregation of transparency-specific AI functions and higher-frequency data.

Scope of the Study

The study covers five purposively selected federal institutions: the Federal Ministry of Finance, the Office of the Accountant-General of the Federation, the Federal Inland Revenue Service, the Central Bank of Nigeria and the Bureau of Public Procurement. Each institution is observed annually from 2015 to 2024, yielding a balanced panel of 50 institution-year observations. The study is limited to documentary evidence, annual reports, audit-related documents and AI-implementation documents and does not collect survey or interview data. The outcome is documented transparency and credibility, not citizen trust. The findings are interpreted for the selected institutions and the period examined, not for all federal ministries, departments and agencies.

Review of Related Literature

Conceptual Review

AI, Transparency and Trust: International Evidence

Artificial intelligence has increasingly been discussed as a means of strengthening transparency in government financial reporting and improving public trust in financial information. Through automated explanations, anomaly detection and the processing of complex financial data, AI-enabled systems may make government reports more accessible, understandable and useful to citizens and other stakeholders. Li and Wang (2024), in their discussion of AI-enabled financial reporting in China, associate automated explanations and anomaly detection with higher levels of public trust in government finance. Similarly, Ahmed and Chen (2023) highlight the potential of natural language processing to improve the clarity and accessibility of government financial information, while Kumar and Singh (2023) emphasize its relevance to stakeholders' understanding of complex financial reports. Conceptually, these perspectives suggest that AI may contribute to public trust by reducing information barriers and enabling stakeholders to better understand how public funds are managed.

However, the relationship between AI-enabled transparency and public trust extends beyond the availability of financial information. Transparency is more likely to support trust when disclosed information is understandable, credible and perceived as relevant to public concerns. Kumar et al. (2020) examine AI-powered tools and trust in

government financial reporting over time, while Zhao et al. (2023) highlight the potential of digital transparency tools to encourage citizen engagement. These perspectives suggest that accessible financial information may create opportunities for public scrutiny and participation, which can contribute to trust-building. Nevertheless, transparency should not be treated as sufficient to guarantee trust, since stakeholders' perceptions may also depend on the credibility of disclosed information, the responsiveness of public institutions and the extent to which identified irregularities are addressed.

Despite these potential benefits, the international literature presents limitations that are important for conceptual development. Much of the existing research relies on cross-sectional designs or focuses on wealthier countries, limiting the extent to which its conclusions can be transferred directly to developing-country contexts. Furthermore, where trust is measured through perception surveys, the findings may reflect respondents' subjective assessments rather than demonstrated improvements in financial accountability. The limited availability of comparable trust data for Nigeria's federal institutions also presents a challenge for evaluating these relationships within the Nigerian context. Accordingly, a key conceptual consideration is how AI-enabled transparency may influence public trust under different institutional and technological conditions. This provides a basis for examining the potential relationship between AI, transparency and trust in Nigeria's federal public sector, while recognizing that improved access to financial information does not necessarily translate into greater public confidence.

African and Nigerian Evidence

The application of artificial intelligence to public financial management in African countries provides a useful context for understanding the potential relationship between digital transparency and public trust. Ochieng and Mwangi (2022) discuss AI-driven analytics in Kenya, highlighting their contribution to the timeliness and accuracy of public financial reports and their potential to strengthen citizen trust. Similarly, Osei and Boateng (2020) examine AI analytics in Ghana's public financial management, emphasizing their relevance to improving transparency. Conceptually, these perspectives suggest that AI may strengthen financial transparency by improving the availability, accuracy and timeliness of information on public resource management. However, the extent to which these improvements translate into public trust depends on whether stakeholders can access, understand and regard the disclosed information as credible.

In Nigeria, Akinola and Lawal (2023) associate AI-supported systems with improvements in audit compliance and data precision, which they link to greater transparency in public financial management. Nsoke (2024) similarly discusses the potential of AI to enhance transparency in government financial management while identifying cost and technical expertise as constraints. These perspectives indicate that the contribution of AI extends beyond the automation of financial processes to the potential strengthening of information quality and institutional oversight. Nevertheless, improved data precision or audit compliance should not automatically be interpreted as evidence of increased public trust. Rather, these developments may create conditions for greater trust when financial information is credible, irregularities are addressed and institutions demonstrate accountability in their use of public resources.

An additional consideration is the transparency and accountability of the AI systems themselves. Awosika et al. (2024) emphasize the importance of explainability and privacy protection in fostering institutional trust. This raises a conceptual issue: although AI may improve access to financial information, opaque algorithms, inadequate explanations or concerns about data privacy could undermine confidence in the systems producing that information. Jejeniwa et al. (2024) further highlight the importance of infrastructure and regulatory arrangements in determining whether the potential transparency benefits of digital technologies can be realized. Together, these perspectives suggest that the relationship between AI and public trust depends not only on the quality of financial disclosures but also on the transparency, reliability and governance of the technologies through which information is generated and communicated.

For Nigeria's public sector, these considerations provide a basis for examining AI-enabled transparency as a potential pathway to institutional trust rather than an automatic outcome of technological adoption. The conceptual relationship involves both the information benefits of AI, including improved accuracy and accessibility, and the institutional conditions required to make those benefits meaningful to citizens. Accordingly, explainability, privacy protection, technical capacity and appropriate regulation are important considerations in understanding how AI-enabled financial transparency may contribute to public trust within Nigeria's federal public sector.

Empirical Review

Li and Wang (2024), in their longitudinal study *The Impact of AI-Enabled Financial Reporting on Public Trust in Chinese Government*, conducted surveys over three years with over 1,000 respondents and demonstrated that AI features like automated explanations and anomaly detection substantially improve public trust.

Zhao et al. (2023) investigated *Digital Transparency and Citizen Participation* using empirical data from Sacramento's crowdsourcing platform and found that AI-powered transparency tools significantly increased citizen engagement and trust in government decision-making.

Tariq and Malik (2023), in a quantitative study across multiple Pakistani government agencies in *The Effectiveness of AI-Powered Cybersecurity Frameworks in Protecting Government Financial Databases*, demonstrated that AI-enhanced security protocols lowered cyber-attack risks by 40%, positively influencing stakeholder trust.

Ahmed and Chen (2023) employed a mixed-methods design combining experimental approaches and interviews with government auditors to assess the impact of Natural Language Processing (NLP) tools on financial reporting. Their findings showed that NLP improves the clarity and comprehensibility of complex financial data, which positively affects stakeholder trust by making government reports more transparent and user-friendly.

Kumar and Singh (2023), in *The Role of Natural Language Processing in Enhancing Accessibility of Government Financial Reports*, used a mixed-methods design with NLP readability analysis and citizen surveys (N = 800), finding that NLP tools improve comprehension of complex financial documents and boost public confidence in disclosures.

Ochieng and Mwangi (2022), using time-series data and regression analysis in *AI-Driven Analytics for Enhancing Public Financial Management Transparency in Kenya*, found that AI analytics improve the timeliness and accuracy of public financial reports, leading to increased citizen trust.

Chen (2022) investigated *The Impact of AI Transparency Platforms on Citizen Trust in China's Local Governments* by conducting panel data analysis on 200 local governments, finding that AI-enabled dashboards are positively correlated with increased trust in governmental financial reporting.

Research Gap

The evidence above is dominated by cross-sectional designs, perception-based measures of trust and studies in wealthier jurisdictions. There is little panel evidence for Nigerian federal institutions on whether documented AI adoption is associated with documented transparency, and little explicit attention to whether that association is robust to institutional differences and common temporal trends. The gap, then, is empirical: whether documented AI adoption and documented transparency move together in Nigerian federal institutions, once institutional differences and common temporal trends are accounted for, has not been examined with institution-level, multi-year documentary evidence and the distinction between supply-side transparency and demand-side trust has not been preserved.

Theoretical Framework: Agency Theory

Agency theory, developed by Jensen and Meckling (1976), provides a theoretical basis for understanding the relationship between AI adoption, financial transparency and accountability in the public sector. The theory explains the potential conflicts of interest that arise when principals delegate responsibilities to agents who possess greater information about their actions and decisions. In government, citizens can be conceptualized as principals who entrust public officials with the management of public resources, while government officials act as agents responsible for making financial decisions and reporting on the use of public funds. Information asymmetry may limit citizens' ability to assess these decisions, creating a need for effective transparency and accountability mechanisms.

From an agency-theoretic perspective, financial transparency can reduce information asymmetry by making government financial activities more accessible to citizens and other stakeholders. AI may support this process through automated reporting, improved data processing, anomaly detection and the timely presentation of financial information. These capabilities could make government financial reports more consistent, understandable and accessible, thereby strengthening the capacity of stakeholders to scrutinize public expenditure and assess compliance with financial obligations. However, the potential contribution of AI depends on the accuracy, accessibility and explainability of the information generated. Technology alone cannot guarantee transparency if financial disclosures remain incomplete or institutional accountability mechanisms are ineffective.

Agency theory therefore provides the accountability rationale for examining the relationship between AI adoption and the transparency of government financial reporting in Nigeria's federal public sector. Within this framework, AI adoption is conceptualized as a technological capability that may reduce information asymmetry, while financial

reporting transparency represents an outcome through which this potential contribution can be assessed. The theory thus helps explain why the adoption of AI-enabled financial systems may be relevant to strengthening public oversight, although the extent of this relationship remains dependent on institutional and technological conditions.

Methodology

Sample

The study employs a longitudinal archival research design using a balanced panel of five purposively selected federal institutions: the Federal Ministry of Finance (FMF), the Office of the Accountant-General of the Federation (OAGF), the Federal Inland Revenue Service (FIRS), the Central Bank of Nigeria (CBN) and the Bureau of Public Procurement (BPP) observed over 2015–2024 (50 observations). Institutions were selected for the availability and consistency of documentary evidence, so results should not be extrapolated to all federal MDAs. The sample is not probability-based, and results apply to these institutions.

Variables

Level of AI adoption (AIA) is a five-point (0–4) composite measuring the extent to which AI technologies are integrated into financial reporting processes. The rubric assigns scores as follows: 0 = no documentary evidence; 1 = policy statement or intention only; 2 = pilot, tender or procurement stage documented; 3 = partial deployment in at least one functional area; 4 = full documented deployment across core financial reporting operations.

Transparency and public trust (FRQ5) is a five-point (0–4) composite reflecting the openness, clarity and credibility of government financial reports as evidenced in institutional documents. The rubric assigns scores on the same 0–4 scale. The outcome is not measured from citizens' perceptions. For that reason, FRQ5 is interpreted here as documented transparency and credibility, which is a necessary but not sufficient condition for public trust.

Scores are derived from annual reports, audit-related documents and AI-implementation documents using the predefined rubrics. Both variables are ordinal-derived indices; coefficients are therefore in index points, not physical measures of disclosure. To support scoring consistency, a second coder independently scored a random subset of 20% of the institution-year observations, and discrepancies were resolved by re-examining the underlying documentary evidence.

Estimation

The baseline model is specified as:

$$FRQ5_{it} = \beta_0 + \beta_1 AIA_{it} + \varepsilon_{it}$$

where $FRQ5_{it}$ denotes the transparency score for institution i in year t, AIA_{it} represents the corresponding overall AI adoption score, and ε_{it} is the error term. The model is estimated by pooled ordinary least squares (OLS) and by an institution fixed-effects estimator with HC3 robust standard errors.

A Hausman test does not reject random effects ($\chi^2 = 0.068$, $p = 0.794$), and the random-effects slope (0.701) is nearly identical to the fixed-effects slope (0.708). Fixed effects are reported because institutional mandates, data capacity and publication practices plausibly correlate with adoption, and the panel has only five units.

Robustness checks add a linear trend:

$$FRQ5_{it} = \alpha_i + \beta_1 AIA_{it} + \beta_2 Trend_t + \varepsilon_{it}$$

use first differences:

$$\Delta FRQ5_{it} = \beta_1 \Delta AIA_{it} + \Delta\varepsilon_{it}$$

and lag AIA by one year:

$$FRQ5_{it} = \alpha_i + \beta_1 AIA_{i,t-1} + \varepsilon_{it}$$

These specifications assess whether the association survives controls for institutional differences and common temporal drift, and they mitigate, but do not eliminate concerns about reverse causality. Because first differences use 45 observations and discard between-institution variation, they are a demanding test, and results are interpreted with that in mind.

Statistical significance is assessed at the 5% level. The results are interpreted with consideration of the small number of institutions, the documentary basis of the measurements and the observational nature of the research design. In particular, the use of heteroskedasticity-consistent standard errors does not, by itself, eliminate concerns about serial dependence or common shocks in a panel containing only five institutions, so the reported p-values are treated as lower bounds on uncertainty rather than as exact. The estimates are therefore interpreted conservatively: the pooled and fixed-effects coefficients are treated as upper references, the trend-adjusted and first-difference coefficients as the more demanding tests, and the lagged coefficient as evidence on timing rather than on contemporaneous association, a distinction that matters particularly for the transparency outcome, where the first-difference estimate is not statistically significant.

Results

Descriptive Statistics

Mean transparency is 3.18 (SD = 0.52), the lowest mean of the five reporting outcomes examined in this research programme, and mean AI adoption is 3.79 (SD = 0.67). Over the decade, institutional averages rise from 2.35 to 3.84 for transparency and from 2.82 to 4.73 for adoption, so adoption gains (1.90 points) outpace transparency gains (1.49 points). The two are strongly correlated (r = 0.90), reflecting this common upward drift.

The high correlation and the parallel upward trends in both series motivate the estimation strategy set out: the trend and first-difference specifications are needed to assess how much of the raw association survives once common temporal drift is removed.

Table 1. Descriptive statistics and correlation matrix (N = 50)

Variable	Mean	SD	Min	Max	1	2
1. FRQ5 (transparency and credibility)	3.18	0.52	2.00	4.50	1.00	
2. AIA (overall AI adoption)	3.79	0.67	2.00	5.00	0.90	1.00

Note: FRQ5 = transparency and credibility of financial reports; AIA = overall AI adoption. Scores are composite indices on a 0–4 rubric, rescaled here to a 1–5 reporting range for presentation. The final two columns report pairwise

Pearson correlations; the diagonal is 1.00 by construction and the upper triangle is left blank. Source: Author's computation from the panel dataset.

Main Estimates

Table 2. AI adoption and transparency of government financial reports (dependent variable: FRQ5)

Specification	Coefficient on AIA	Robust SE	p-value	N
Pooled OLS	0.701	0.049	< 0.001	50
Fixed effects (institution)	0.708	0.057	< 0.001	50
Fixed effects + linear trend	0.616	0.315	0.051	50
First differences	0.604	0.380	0.112	45
Fixed effects, AIA lagged one year	0.599	0.084	< 0.001	45

Note: Pooled model: constant = 0.517 (p = 0.009), R^2 = 0.810, adjusted R^2 = 0.806, F = 204.4. Standard errors other than pooled are HC3-robust. The first-difference and lagged models lose the first year for each institution (5 observations), yielding N = 45. Source: Author's computation from the panel dataset.

In the pooled model, one additional point of AI adoption is associated with 0.701 points higher transparency (SE = 0.049, t = 14.30, p < 0.001), and adoption accounts for 81.0 per cent of its variation. The within-institution coefficient is 0.708 (robust SE = 0.057), with a within R^2 of 0.779. Diagnostics are satisfactory: the Durbin–Watson statistic of 1.95 is close to the conventional value of 2, indicating no first-order autocorrelation; the Breusch–Pagan test provides no evidence of heteroskedasticity (p = 0.413); and the Jarque–Bera test does not reject normality of residuals (p = 0.868). On the baseline specifications, the null hypothesis of no association (H_o) is rejected in favour of the alternative (H_1).

Robustness: Where the Evidence Weakens

The robustness checks yield a more qualified picture than for the study's other relationships. With a common time trend, the coefficient falls to 0.616 and its significance becomes marginal (HC3 p = 0.051). In first differences, which relate yearly changes in transparency to yearly changes in adoption, the coefficient is 0.604 but is not statistically distinguishable from zero (p = 0.112). The lagged specification, by contrast, retains a coefficient of 0.599 that is highly significant.

A fair summary is that institutions and years with higher adoption are consistently more transparent, and transparency tends to follow adoption over multi-year horizons, but year-to-year movements in transparency are only weakly tied to year-to-year movements in adoption. This is a plausible pattern if transparency responds to AI with delay, if it is determined partly by annual publication practices, or if the index is noisier for this outcome. The data cannot discriminate among these explanations. The result also demonstrates why a significant pooled coefficient should not be treated as the end of the analysis.

Discussion

This section discusses the findings in relation to theory and prior evidence, distinguishes supply-side transparency from demand-side trust, and identifies the study's limitations.

The baseline association supports the idea that AI-supported reporting systems contribute to openness and credibility, in line with studies from China, Kenya, Ghana and Nigeria (Akinola & Lawal, 2023; Li & Wang, 2024; Ochieng & Mwangi, 2022; Osei & Boateng, 2020). It also fits the view that technologies which make reporting faster, more consistent and easier to read help agents to account to principals. The weaker robustness results, however, suggest that AI adoption alone is a modest driver of transparency. Transparency is shaped by legal disclosure obligations, publication practices, political will, the accessibility of platforms to ordinary citizens and the capacity of media and civil society to use the information. These factors are not captured by the AI index and are only partly absorbed by institution effects and a common trend.

The relation to public trust needs particular care. The study's outcome is a documentary score of transparency and credibility. Trust is a perception held by citizens, shaped by past experience, political context and media, and may lag or diverge from measurable openness. International studies that find trust gains typically measure them with surveys or participation data (Kumar et al., 2020; Zhao et al., 2023). No such measure is available here, so the study cannot show that trust rose with AI adoption. What it can say is that the supply of transparency, which is necessary for trust, is positively associated with AI adoption, and that the lowest mean transparency score among the five outcomes is consistent with the argument that technical gains are not translating quickly into transparent, credible reporting. Initiatives that publish AI-supported reports should therefore be accompanied by explanation, civic engagement and independent audit validation, and AI systems used in reporting should themselves be explainable and auditable (Awosika et al., 2024).

Limitations. The study has five principal limitations. First, the sample is small (five institutions) and purposively selected for documentary availability, which may favour better-resourced entities. Second, documentary scoring may under-record disclosure, and the absence of a reference to AI in an annual report does not prove the absence of AI. Third, the composite outcome combines openness, clarity and credibility, and the data do not allow the three dimensions to be separated. Fourth, the AI index measures overall adoption and does not distinguish transparency-specific functions such as natural language summarisation or open-data portals. Fifth, the study has no citizen-level data, so it can speak to the supply of transparency but not to public trust. The study should not be read as evidence that AI adoption caused transparency to improve, nor that the pattern generalises to all federal MDAs.

Conclusion and Recommendations

Conclusion

In general, AI adoption is positively associated with the transparency of government financial reporting in five Nigerian federal institutions over 2015–2024, but the association is the least robust of those examined in this research programme and cannot be read as evidence of increased public trust. The pooled and fixed-effects coefficients (0.701 and 0.708) are large and highly significant, but the trend-adjusted coefficient (0.616) is only

marginally significant (p = 0.051) and the first-difference coefficient (0.604) is not statistically significant (p = 0.112). The lagged coefficient (0.599) remains highly significant, which is consistent with a delayed relationship between adoption and transparency over multi-year horizons.

The conclusion must be stated with precision. The coefficients are associations between two documented indices, not causal estimates of the effect of AI on transparency. The weak first-difference result shows that year-to-year movements in transparency are only weakly tied to year-to-year movements in adoption, and the fixed-effects and lagged results mitigate, but cannot eliminate, concerns about reverse causality. The findings therefore support a conditional and directional conclusion: in the selected institutions, deeper documented AI adoption is associated with better documented transparency, but the association is modest and not robust throughout. They do not establish that AI adoption caused transparency to improve, and they cannot establish that public trust rose. The practical implication is that AI investment should be treated as one component of a transparency strategy, not as a substitute for it.

Recommendations

i. Institutions should publish AI-supported reports in accessible formats and plain language, release machine-readable data, document how AI is used in reporting, and subject automated outputs to independent audit. AI systems used in reporting should themselves be explainable and auditable (Awosika et al., 2024).

ii. Governments and civil society should build the capacity to use published information. Transparency is shaped by publication practices, political will, platform accessibility and the capacity of media and civil society to act on the information; these are not captured by the AI index and are only partly absorbed by institution effects and common trends.

iii. Because AI adoption appears to be a helpful but insufficient condition for transparent reporting, policy should treat technology investment as one component of a transparency strategy that also includes legal disclosure obligations, publication standards, plain-language communication, machine-readable data and independent audit validation.

iv. Four directions follow directly from the limitations of this study. First, researchers should measure trust directly through repeated citizen surveys and link those measures to institutional reporting. Second, studies should disaggregate AI applications relevant to transparency, natural language summarisation, open-data portals, automated disclosure — to test whether the association is stronger for transparency-specific functions. Third, higher-frequency data would allow the delayed relationship suggested by the lagged estimates to be tested more precisely. Fourth, comparisons across federal, state and local governments would allow the federal-institution findings reported here to be placed in a wider context.

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